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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,872	03/18/2004	Radoslaw Romuald Zakrzewski	BFM-02801	5468

54/004 7590 08/20/2008
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EXAMINER

COUGHLAN, PETER D

ART UNIT

PAPER NUMBER

2129

MAIL DATE

DELIVERY MODE

08/20/2008

PAPER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/803,872

Filing Date: March 18, 2004

Appellant(s): ZAKRZEWSKI, RADOSLAW ROMUALD

Mr. Donald Muirhead
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 6/12/2008 appealing from the Office action mailed 2/1/2008.

(1) Real Party in Interest

Simmonds Precision Products Inc is the real party in interest in the above reference patent application.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Claims 1-36 under the rejection 35 U.S.C. §101 is to be reviewed on appeal. Rejections under 35 U.S.C. §112 are withdrawn.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-36 are rejected under 35 U.S.C. 101 for nonstatutory subject matter. The computer system must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77. The verification of the accuracy of a component lacks a practical application. This statement is within the realm of being abstract due to its nature it can be applied to numerous real world applications. The result has to be a practical application.

In addition, the claims and specification obtain preemption. Within the abstract, the invention can be used for, 'neural networks or other hardware or software component.' In addition, the model may be a fuzzy logic model, a fuzzy logic classifier, and a statistical k-neighbor classifier. (¶0009) Although this is abstract it leads to a staggering amount of possible uses and applications.

In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and

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concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. Is this model that of the flight characteristics of an aircraft wing, or a model of the spread of a disease through out a country, or a model of obesity among people of a given region? If so, no such results have not been claimed.

The invention must be for a practical application and either:

- 1) specify transforming (physical thing) or
- 2) have the FINAL RESULT (not the steps) achieve or produce a useful (specific, substantial, AND credible), concrete (substantially repeatable/ non-unpredictable), AND tangible (real world/ non-abstract) result.

A claim that is so broad that it reads on both statutory and non-statutory subject matter, must be amended.

A claim that recites an invention that 'verifies' has no practical application. The claimed invention is an abstract concept that can lead to numerous applications but as stated within the specification, falls short of a practical application. There must be a result that is a practical application.

Claims 1, 16-19, 34-36 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. These claims contain the variable ϵ which is allowed

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to approach zero. When ε approaches 0, the value of $1/\varepsilon$ approaches infinity. Thus these claims lack utility.

Claims 1, 16-17, 19, 34-35 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. The value δ is allowed to approach zero and the value of $\ln(1/\delta)$ approaches negative infinity. Thus these claims lack utility.

(10) Response to Argument

Appellant's argument

ARGUMENT

1. The Examiner has failed to establish a prima-facie argument that claims 1-36 are directed to non-statutorily patentable subject matter under 35 U.S.C. §101 or lacking patentable utility thereunder.

A. Standard for Patentability Under 35 U.S.C. 101

Under 35 U.S.C. 101, patentable subject matter must belong to at least one of four patentable categories: process, machine, manufacture, and composition of matter. See *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007). A claim reciting an algorithm or abstract idea can state statutory subject matter only if, as employed in the process, it is embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, i.e., a machine, manufacture, or composition of matter. *In re Comiskey*, 499 F.3d 1365 (Fed. Cir. 2007). Further, a claimed invention, as a whole, must be useful and accomplish a practical application that produces a "useful, concrete and tangible result." See, e.g., *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352 (Fed. Cir. 1999). A claim may not wholly preempt a mathematical formula so as to be, in practical effect, a patent on the formula itself. *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368, 47 USPQ2d 1596, (Fed. Cir. 1998). In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, and not for the abstract idea, natural phenomenon, or law of nature itself. See *Id.* Transformation and reduction of an article

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"to a different state or thing" indicates the patentability under 35 U.S.C. 101 of a process claim. *Gottschalk v. Benson*, 409 U.S. 63 (1972).

Examiner's response

Appellant brings to light 'State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F.3d 1368, 47 USPQ2d 1596' which the practical application was to determine the price of a share. The invention describes a method for verifying accuracy of a component that is implemented from a model. This can be used in numerous applications based on what model is to be employed. These claims fail to provide a practical application.

Appellant's argument

B. The Examiner's conclusions that Appellant's claims are directed to non-statutorily patentable subject matter under 35 U.S.C. 101 or lacking patentable utility thereunder have been made in error.

The system of the presently-claimed invention provides for randomized verification of components, such as neural networks. As one example in the specification, Appellant discloses that a component, such as a neural net, may be provided by a simulation model of an aircraft subsystem. The model may be an approximation of the actual physical system and may introduce a degree of error or uncertainty. The approximation error between the system and the model may rarely be assessed with certainty and may be expressed in probabilistic terms. Thus, even if an algorithm is deterministically verified against a system model, there may remain a statistical uncertainty regarding validity of such result, which suggests that the use of a deterministic approach to verification may not be suitable. (See, for example, page 36, lines 1-21 and page 44, lines 1-22 of the originally-filed specification.) Appellant's presently-claimed invention provides for randomized verification of the accuracy of a component implemented from a model based on using test points for a test of the component that are randomly selected. (See, for example, page 43, lines 7-22 of the originally-filed specification). Appellant has found that a randomized verification method may be applicable to a much wider spectrum of practical problems than previously developed for the deterministic

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verification approach. (See, for example, page 47, line 11 to page 48, line 11 of the originally-filed specification.)

The rejection of claims 1-36 under 35 U.S.C. 101 for non-statutorily patentable subject matter (and also to the extent this rejection is the basis for any rejection under 35 U.S.C. 112, first paragraph) is hereby traversed and reconsideration is respectfully requested. The Office Action concludes that determining accuracy of a component is not statutory and states that to be statutory under 35 U.S.C. 101, a claim must be directed to a practical application having a final result that is useful (specific, substantial and credible); concrete (substantially repeatable / non-unpredictable); and tangible (real world / non-abstract). Appellant recites that a component is implemented from a model, and the component is tested according to a randomized verification technique to verify accuracy according to criteria defined in the claim to verify whether the component is an accurate implementation of the model. A number of randomly selected samples is defined according to the recited features and the accuracy is verified according to a selected criterion. Appellant refers, for purposes of example and further explanation, to page 43, line 6 to page 45, line 2 of the originally-filed specification. Appellant submits that that the final result of the presently- claimed invention, for example, a component implemented from a model that is verified as accurate according to the recited criteria, is useful, concrete and tangible, as further discussed below.

The Examiner concludes that an invention that "verifies" has no practical application (top of page 4 of the Final Office Action). Appellant submits that this conclusion is demonstrably incorrect. There is no exclusion of patentability under 35 U.S.C. 101 simply because a claimed invention is directed to a process of verification. Verification of accuracy of a component implemented from a model is a practical application. Specifically, following verification of accuracy of a component, the component is turned into a verified component, which is a different state of the component and which is a useful, concrete and tangible result. (See, for example, FIG. 2 and page 49, lines 19-24 of the originally-filed specification). For example, a practical application would be determining if a component has not been accurately implemented from a model of the component, in which case, for example, the component could be discarded or indicated as needing to be corrected. Further, the Office Action appears to actually suggest that the claimed invention has too many applications (see page 3 of the Office Action) in discussing "preemption" of Appellant's claims, stating on page 9 of the Office Action in question form whether the claimed invention would be suitable for a model of flight characteristics of an aircraft wing, a model of the spread of a disease throughout a country or a model of obesity among people of a given region. Appellant submits that if the same method steps, as recited by Appellant, are applied to determine whether a component generated from any of the above-noted models is accurately implemented from the model, then it is unclear why the Examiner considers that the method steps would not recite an invention having a practical application if applicable to all of the above-noted models.

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Examiner's response

The Appellant states that the method of providing randomized verification of accuracy of a component implemented from a model is a practical application. The Examiner disagrees. Since a 'model' can be any model this statement can be used in numerous practical applications based on what the 'model' describes. These claims fail to provide a practical application.

Appellant's argument

Although the Examiner attempts to suggest that Appellant's claim invention "obtains preemption" because it can be directed to many models, Appellant submits that the practical application, recited by Appellant, is the verification of whether a component, implemented from a model, is accurate to that model. Appellant describes a process for such verification and including mathematics-based steps for verifying the accuracy of the component implemented from the model. Specifically, the Examiner attempts to conclude that Appellant's claimed invention lacks a practical application because of its application to many models, but apparently fails to recognize that the final result of the claimed invention is verifying the accuracy of a component implemented from the model. That is, the Examiner's recitation (e.g., on page 3 of the Final Office Action) of many possible models to which the Appellant's claimed invention may be applied, fails to recognize that the practical application of the claimed invention is verifying if the component has been accurately implemented from the model. For example, Appellant refers to the discussion in the specification on page 43, lines 7-22 of the originally-filed specification. Appellant's claims are directed, not to a model, but to a result (component) implemented from that model, and specifically verification of the accuracy of that component. Accordingly, the claims produce a result tied to the physical world, the final result being useful, concrete and tangible, and that does not preempt a judicial exception, and thus the claims meet the statutory requirements of 35 U.S.C. 101.

Examiner's response

The statement that a model is used to provide randomized verification of accuracy obtains preemption. There is no limiting guidelines on what model is to be used, therefore numerous models can be employed which directs the claims towards preemption.

Appellant's argument

Further, specifically with respect to Examiner's statement on page 9 of the Final Office Action that: "No example is provided which illustrates a practical application of the invention", Appellant directs particular attention to discussion in the specification, as noted above, concerning applicability of the claimed invention to an aircraft subsystem, for example (see page 44 of the Originally-filed specification). Accordingly, in view of the above, Appellant submits that the rejection should be reversed.

Examiner's response

Paragraph 0026 of the specification states ' The foregoing deterministic verification approach may be used in verification of neural nets used with many safety-critical applications such as, for example, a fuel measurement system, estimation of aircraft weight, or other functions that may be performed by an aircraft system such as the health, utility and maintenance system used in determining the health of aircraft components.' The phrase 'safety critical applications' can have numerous practical applications. In addition, paragraph 0026 states the use of 'verification of neural networks' wherein claim 1 states the 'verifying accuracy of a component that is implemented from a model' illustrate two different domains from the specification and

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the claims. The specification further supports the Examiner's response of preemption by disclosing just a few examples which are considered 'safety critical applications.'

Appellant's argument

The rejection of claims 1, 16-19, and 34-36 under 35 U.S.C. 101 as lacking patentable utility and the rejection of claims 1, 16-17, 19 and 34-35 on the same basis (and also to the extent this rejection is the basis for any rejection under 35 U.S.C. 112, first paragraph) are hereby traversed and it is respectfully requested that these rejections be reversed. The Office Action appears to object to the use of a confidence value (δ) that is between 0 and 1 and to the accuracy level (ϵ) being between 0 and 1, and the use of these variables in determining a number of randomly selected samples M in the equation $M \geq (1/\epsilon) \ln(1/\delta)$. In the prior Office Action, the Examiner had concluded that the equation somehow indicates that "infinity is less than infinity which makes no sense." (see p. 4, August 9, 2007 Office Action.) Appellant submits that the above-noted confidence value (δ) and the accuracy level (ϵ) for the selection of randomly selected samples in the above-noted equation do not yield the conclusion "infinity is less than infinity" so as to be senseless. Instead, Appellant submits that in view of the above-noted equation, the values and limits correctly characterize the mathematical relationship for determining the number of randomly selected samples M, as further discussed below.

Rather than being "senseless", the equation for selecting the number of randomly selected samples M indicates that as the confidence value and accuracy level decrease in accordance with the recited features, the number of randomly selected samples required increases, based on the natural log of one divided by the confidence value and one over the accuracy level. The equation characterizes an analysis that the smaller the confidence value and more precise the level of accuracy desired, the higher the number of random samples required, as dictated by the above-noted equation. Appellant submits there is no arbitrary cutoff as the confidence value (δ) and the accuracy level (ϵ) become smaller and smaller with respect to the number of randomly selected samples recited by the claimed invention in accordance with the recited bounds. Instead, the relationship between confidence value, accuracy level and number of randomly selected samples is accurately characterized by the equations, and defines patentable subject matter in conjunction with the other recited features. That is, if a very precise level of accuracy with a very narrow confidence interval is desired then many random samples will be required to achieve this. This is the relationship defined by the equation according to the variables therein. The Examiner's analysis of the equation appears somewhat flawed. Appellant submits that the recited features, specifically in connection with the equation for determining the minimum number of required samples for a

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desired confidence value and accuracy level, have utility and would be well understood by one of ordinary skill in the art.

Accordingly, in view of the above, Appellant respectfully requests that the rejections be reversed.

Examiner's response

Claim 1 contains the formula $M \geq (1/\epsilon) \ln(1/\delta)$ where the ranges can be $0 < \delta < 1$ and $0 < \epsilon < 1$. Lack of utility comes from the values of $1/\delta$ and $1/\epsilon$ as these values approach 0. When these values approach 0 the resulting values approach infinity. As both δ and ϵ approach 0, the values of $1/\delta$ and $1/\epsilon$ approach infinity. Using the initial equation $M \geq \ln(\ln(\infty))$, which lacks utility.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Peter Coughlan/

Examiner, Art Unit 2129

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/Wilbert L. Starks, Jr./
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